# FCC Discussion on Device Capability and 9-1-1 Location

August 23, 2018

# FCC Ex Parte Discussion on 9-1-1 Location

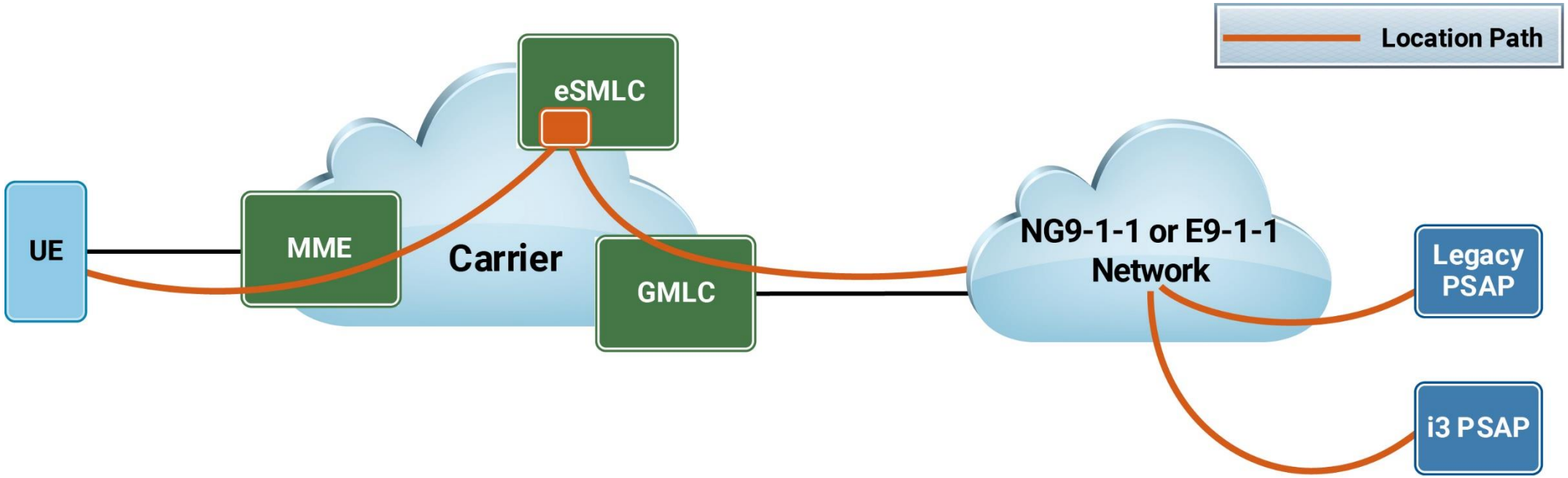
## Description, Diagram, and Pros & Cons for

- Current 9-1-1 Location
- Over the Top (OTT) 9-1-1 Location
- Carrier with OTT for 9-1-1 Location
- Carrier-Device Integration for 9-1-1 Location

# Current 9-1-1 Location

- 9-1-1 jurisdiction decides which cell site sectors' calls will route to which PSAPs
- All calls route immediately based on sector information in call set up signaling
- Carriers are actively implementing precise location estimates in call set up signaling which could be used for routing
- In most instances, carriers determine precise location using a service node in their network working in conjunction with the device
- In rare instances, carriers provide more precise location *prior* to call routing via separate, location signaling, though this location is not used for routing
- PSAPs query for initial location up to 10 seconds after the call is initiated
- Carriers are able to answer many initial PSAP queries with precise location and usually deliver it on 2nd queries

# Current 9-1-1 Location Diagram



# Current 9-1-1 Location Pros and Cons

Pros

- Fast, predictable, reliable routing
- Delivery over standards-based path
- Supports incremental, standards-based improvements

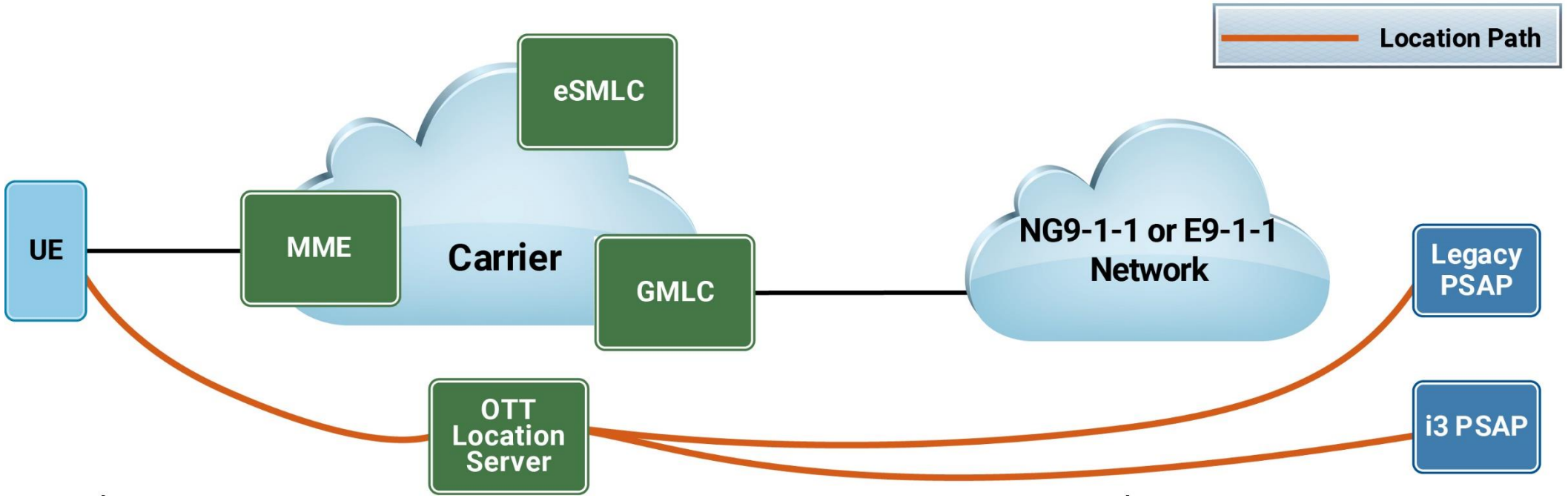
Cons

- Waiting for carrier to deliver precise location faster
- Waiting for devices to integrate with carriers to include, for example, WiFi AP information required by the NEAD
- Approximately 10% of sectors and/or calls would significantly benefit from routing by precise location

# Over the Top (OTT) Company 9-1-1 Location

- Device operating system manufacturers create proprietary location determination algorithms and proprietary methods of delivering location from devices to a server they control
- PSAPs integrate with OTT 9-1-1 location companies and query these companies outside of the 9-1-1 network for “supplemental” data
- Connection to OTT companies is over the internet
- Dispatchers are told to “pick the smallest circle”

# Over the Top 9-1-1 Location Diagram



# Over the Top (OTT) 9-1-1 Location Pros and Cons

Pros

- Faster to deploy
- More precise initial location information than typical carrier location
- Leverages device capability as well as Google's & Apple's large WiFi AP databases

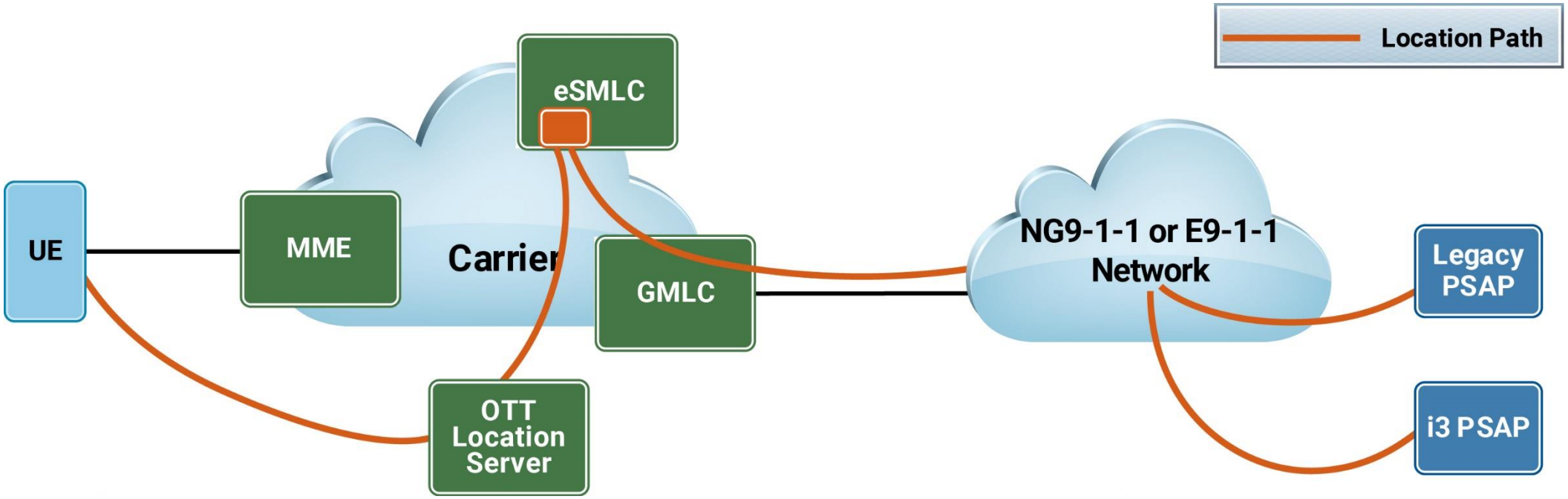
Cons

- Not following 9-1-1 standards
- Does not affect call routing
- Not integrated with wireless carrier or 9-1-1 networks, including the NEAD
- Does not work for all devices
- Creates PSAP security risks related to internet exposure
- Requires PSAP software upgrades and network changes as a "throw away" PSAP cost
- Cannot use carrier's greater knowledge of the carrier network
- Unclear who is accountable for inaccuracies when "smallest circle" is an error

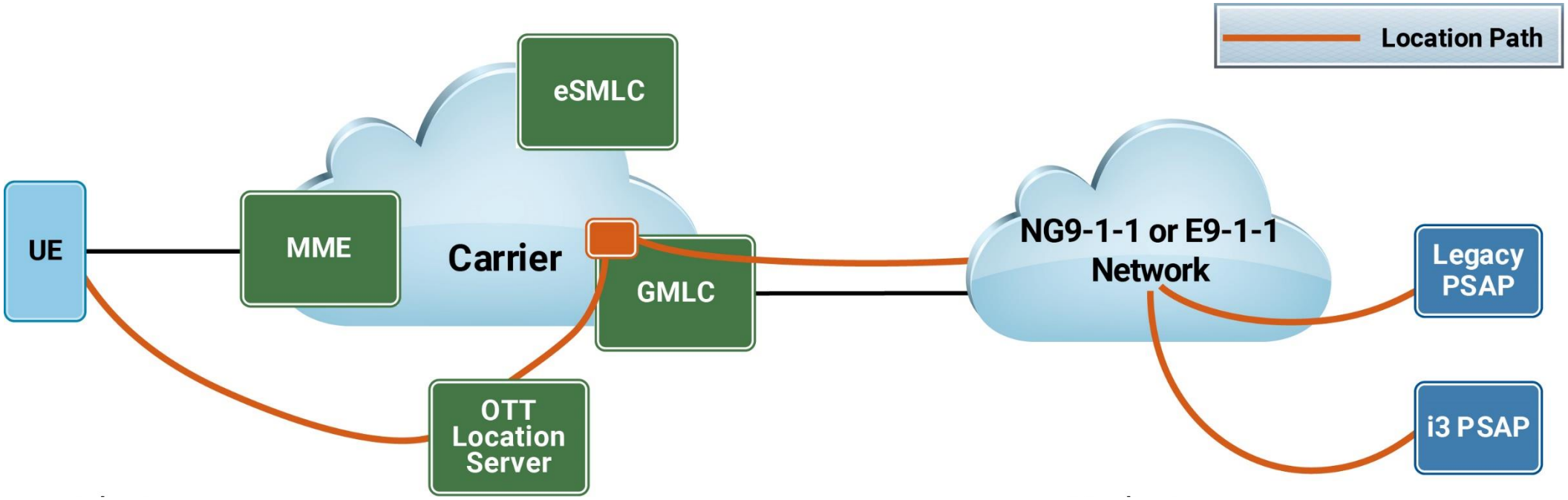
# Carrier with OTT for 9-1-1 Location

- A carrier node acquires a single *location estimate* from an *OTT company location server*
- The carrier completes all location calculations and comparisons from all sources to determine a single, trusted location for the 9-1-1 call
- Carrier may determine call routing using “interim” precise location and deliver an even more precise location to Public Safety
- Carrier has end-to-end visibility of 9-1-1 location information and thus is able to troubleshoot and improve the system

# Carrier with OTT for 9-1-1 Location Diagram #1



# Carrier with OTT for 9-1-1 Location Diagram #2



# Carrier with OTT for 9-1-1 Location Pros and Cons

## Pros

- Deployed to PSAPs using standards for 9-1-1
- Leverages device capability as well as Google's & Apple's large WiFi AP databases
- No additional PSAP personnel training, networking, or software necessary
- No increased security risk associated with internet connections
- Makes routing on location possible

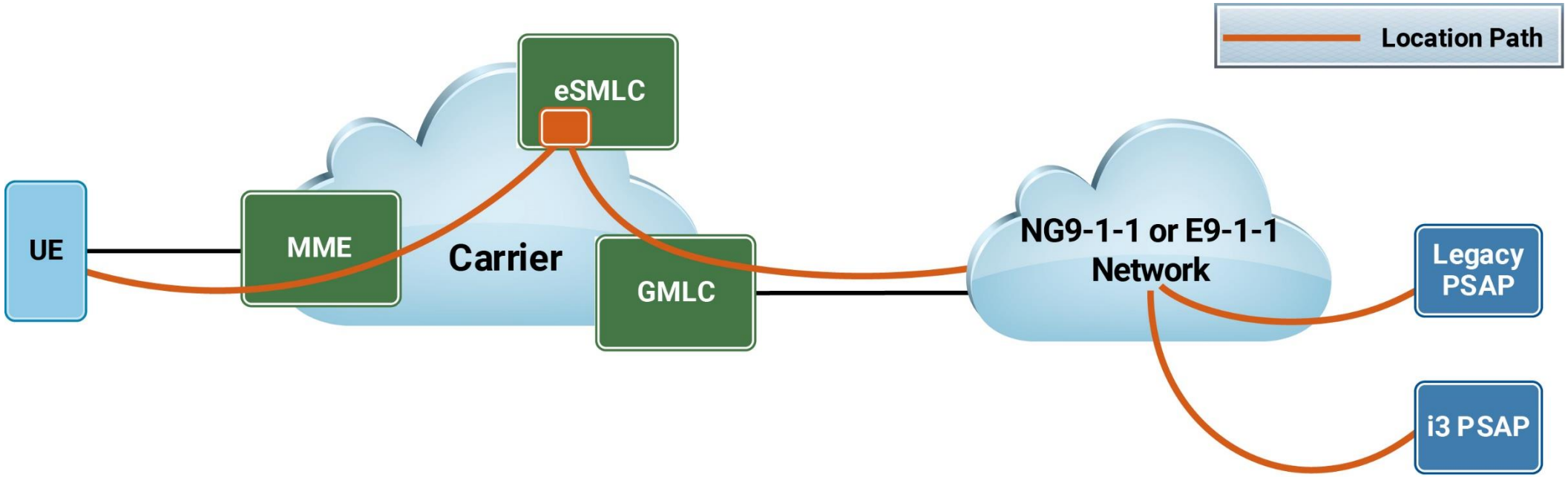
## Cons

- Does not work for all devices
- Changes required in carrier network and may be seen as temporary or "throw away"
- Additional system in the call flow
- Does not enable use of the NEAD

# Carrier-Device Integration for 9-1-1 Location

- A carrier node acquires *all location information*, including WiFi AP information from the *device directly*
- The carrier completes all location calculations and comparisons from all sources to determine a single, trusted location for the 9-1-1 call
- Carrier may determine call routing using “interim” precise location and deliver an even more precise location to Public Safety
- Carrier has end-to-end visibility of 9-1-1 location information and thus is able to troubleshoot and improve the system

# Carrier-Device Integration for 9-1-1 Location Diagram




Note: Same diagram as is used on the “Current 9-1-1 Location” but in this case there will be additional data between the device and the carrier.

# Carrier-Device Integration for 9-1-1 Location Pros & Cons

Pros

- Deployed using standards
- Leverages device capability as well as Google's & Apple's large WiFi AP databases
- No additional PSAP personnel training, networking, or software necessary
- No increased security risk associated with internet connections
- Improves timing for routing on location
- No OTT company server required
- Enables use of the NEAD

Cons

- Will work for all devices but not at the same service level
- Changes required in carrier network and on devices, but these are underway and are considered long-term

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# Acronyms

eSMLC – evolved Serving Mobile Location Center

GMLC – Gateway Mobile Location Center

MME – Mobile Management Entity

PSAP – Public Safety Answering Point

UE – User Equipment